



Pectobacterium disease in zucchini: an emerging problem?

VG16086: Area Wide Management of Vegetable Diseases: viruses and bacteria

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Queensland
Government

Pectobacterium in the field



Research questions

Initial look at symptoms and epidemiology

1. **Identify** the bacteria causing the disease
 2. Are the **symptoms** consistent and can we replicate them?
 3. How does it **spread** through the field?
 - Wounding/ tools
 - Insects
 - Seed
 - Water
 - Crop trash
 - Soil
- **investigate** with a pot trial and field trials





1. Identify the bacteria – WA

Dominie Wright and Craig Webster

Qld isolate

1. MALDI-TOF

Pectobacterium carotovorum subsp. *carotovorum*

2. BIOLOG

Pectobacterium carotovorum

3. Molecular (qPCR)

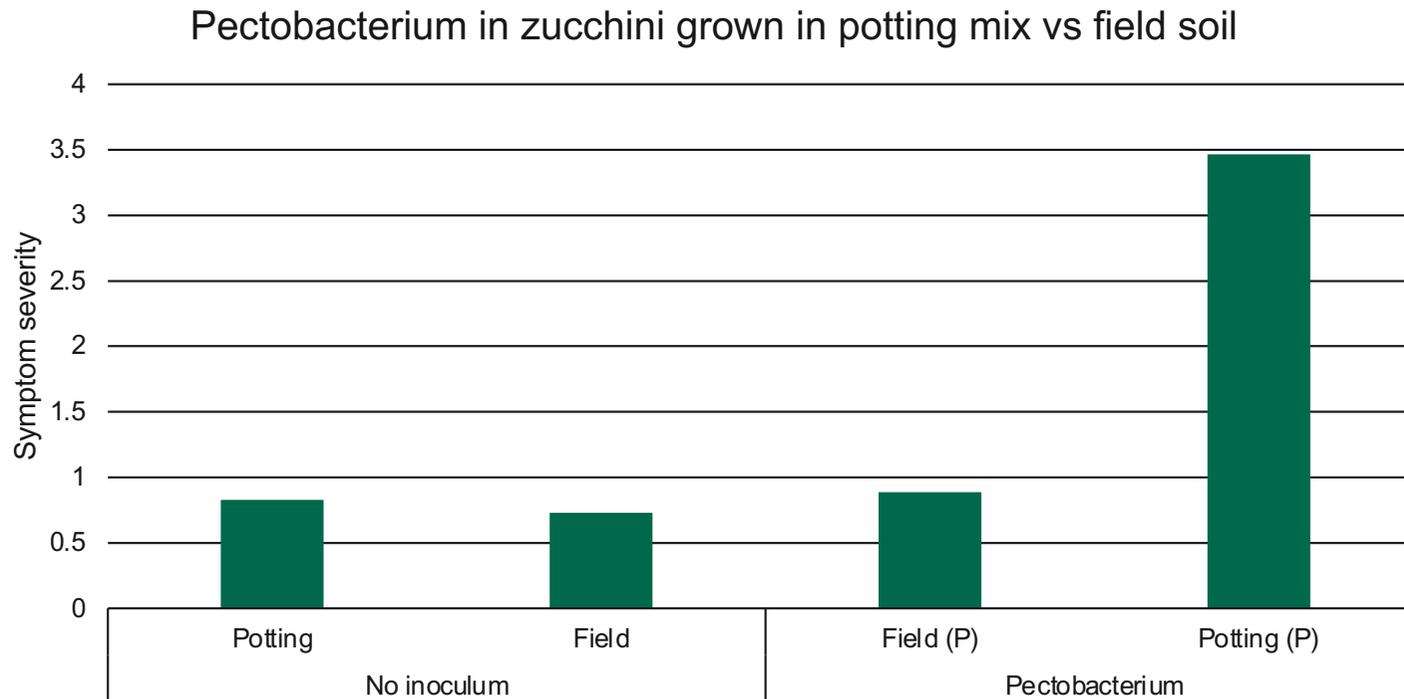
Pectobacterium brasiliense

WA isolate

Pectobacterium brasiliense

2. Symptoms and soil

Pot trial - Qld



P - potting mix, F - field soil, PP - potting mix plus Pectobacterium, FP - field soil plus Pectobacterium
Seed (var. Alessandra) treated with 0.01% bleach at 50'C for 20 min

Can we replicate the symptoms? **Yes!**
Is it soil borne? **Probably not...**

2. Symptoms and soil

Pot trial - WA

Does contaminated soil result in disease? **No!**

Does inoculum applied to the soil result in disease? **No!**

Does wounding of the plants result in disease? **No!**

→ No *Pectobacterium* was detected in this trial after 2 weeks



4. Variety and host range trial

Pot trials - WA

- Are all **zucchini varieties** susceptible?
- Are any **related hosts** susceptible?
- Are related **Pectobacterium isolates** pathogenic on these hosts?

4. Variety and host range trial

Pot trials - WA

→ All tested zucchinis were susceptible

→ Jap pumpkin, butternut, cucumber, luffa, carrot and tomato did not show symptoms

Variety	P. brasiliense (zucchini-WA)	P. brasiliense (zucchini Qld)	P. brasiliense (capsicum-WA)	P. carotovorum subsp. carotovorum (zucchini-WA)
Apollonia	B, O	B, O	B, O	B
Black Jack	B, O	B, O	B, O	B
Brookton	B, O	B, O	B, O	B
Desert	B, O	B, O	B, O	B
Eva	B, O	B, O	B, O	B
HMX586615	B, O	B, O	B, O	B
Luda	B, O	B, O	B, O	B
Nitro	B, O	B, O	B, O	B
Regal Black	B, O, W	B, O, W	B, O, W	B
Rosa	B, O	B, O	B, O	B
Syros	B, O	B, O	B, O	B

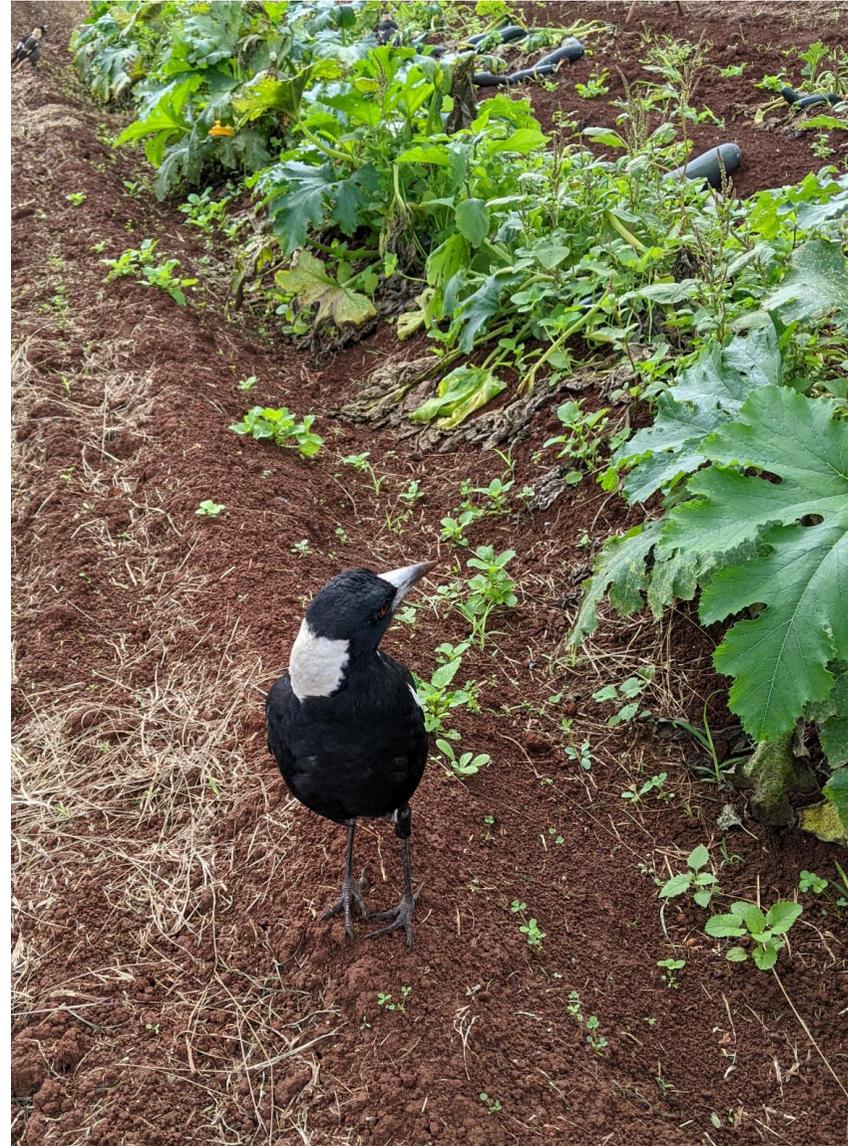


Species	Variety (crop)	Symptoms
Cucurbita pepo	Black Jack (zucchini)	B, W (5/5)
Cucurbita pepo	Jap Pumpkin	No symptoms
Cucurbita pepo	Queensland Blue	B (3/5)
Cucurbita moschata	Butternut	No symptoms
Citrullus lanatus	Afghan melon (weed)	B (1/5)
Citrullus lanatus	Candy Red (watermelon)	B (2/5)
Cucumis sativus	Reko (cucumber)	No symptoms
Cucumis melo	Claudia (rockmelon)	B (2/5)
Luffa acutangular	(Luffa)	No symptoms
Darcus carrota	Stefano (Carrot)	No symptoms
Capsicum annum	California wonderer (Capsicum)	B (2/5)
Solanum lycopersicum	Grosse Lisse (Tomato)	No symptoms

B = browning
W = wilt
O = ooze from crown area

5. Field trial #2 - Qld

- Can we **track** the inoculated bacteria through the field?
- What **insects** are present in the field?



5. Field trial #2 - Qld

- Rapid death across the entire field
- Prolonged rain period

Planted and inoculated end April
24/5



2/6



- Tracking with rifampicin mutant seems to work well
- No evidence of the inoculated mutant bacteria moving through the field
- Evidence of naturally occurring disease in control plants

Next steps

Fill in the gaps!

- Determine if seed borne
- Determine optimal temperature/ conditions for disease
- Further investigate insect involvement
- Further investigate variety and host tolerance, particularly in QLD
- Is this an emerging disease in other crops and regions? E.g. wombok

Current recommendations

- Risk of infection through soil or crop trash is low

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